

PROCEEDINGS
OF
THE ROYAL SOCIETY.

1834-1835.

No. 20.

April 2, 1835.

JOHN WILLIAM LUBBOCK, Esq., M.A., V.P. and Treasurer, in the Chair.

James Burnes, M.D.; Joseph Delafield, Esq.; G. W. Featherstonhaugh, Esq.; James Alexander Gordon, M.D.; Colonel Sir Robert John Harvey; Thomas Leybourn, Esq.; George Moore, Esq.; Arthur Morgan, Esq.; Charles Henry Oakes, Esq., B.A.; John Henry Pelly, Esq.; Richard Taunton, M.D.; William Tite, Esq.; Samuel Warren, Esq.; James Wigram, Esq., M.A.; and Charles J. B. Williams, M.D.; were elected Fellows of the Society.

A paper was read, entitled, "On the Results of Tide Observations, made in June 1834, at the Coast-Guard Stations in Great Britain and Ireland." By the Rev. W. Whewell, F.R.S., Fellow of Trinity College, Cambridge.

On a representation made by the author of the advantages which would result from a series of simultaneous observations of the tides, continued for a fortnight, along a great extent of coast, orders were given for carrying this measure into effect at all the stations of the Preventive service on the coasts of England, Scotland, and Ireland, from the 7th to the 22nd of June inclusive. From an examination of the registers of these observations, which were transmitted to the Admiralty, but part of which only have as yet been reduced, the author has been enabled to deduce many important inferences. He finds, in the first place, that the tides in question are not affected by any general irregularity, having its origin in a distant source, but only by such causes as are merely local, and that therefore the tides admit of exact determination, with the aid of local meteorological corrections. The curves expressing the times of high water, with relation to those of the moon's transit, present a very satisfactory agreement with theory; the ordinates having, for a space corresponding to a fortnight, a minimum and maximum magnitude, though not symmetrical in their curvatures on the two sides of these extreme magnitudes. The amount of flexure is not the same at different places; thus confirming the result already obtained by the comparison of previous observations, and especially those made at Brest; and demonstrating the futility of all attempts to deduce the mass of the moon from the phenomena of the tides, or to correct the tables of the tides by means of the mass of the moon. By the introduction of a local, in addition to the general, semimensual inequality, we may succeed in recon-

ciling the discrepancies of the curve which represents this inequality for different places; discrepancies which have hitherto been a source of much perplexity. These differences in the semimensual inequality are shown by the author to be consequences of peculiar local circumstances, such as the particular form of the coast, the distance which the tide wave has travelled over, and the meeting of tides proceeding in different directions; and he traces the influence of each of these several causes in producing these differences. A diurnal difference in the height of the tides manifests itself with remarkable constancy along a large portion of the coast under consideration. The tide hour appears to vary rapidly in rounding the main promontories of the coast, and very slowly in passing along the shores of the intervening bays; so that the cotidal lines are brought close together in the former cases, and, in the latter, run along nearly parallel to the shore; circumstances which will also account for comparative differences of level, and of corresponding velocities in the tide stream. The author intends to prosecute the subject when the whole of the returns of these observations shall have undergone reduction.

A paper was also read, entitled, "Copies of Registers of the Thermometer kept at Alford, Aberdeenshire." By the Rev. James Farquharson, F.R.S.

The observations recorded in these tables were made at 9^h 15^m A.M., and at 8^h 30^m P.M., each day of the year 1833; and the highest and lowest temperatures in each month observed from the indications of Six's thermometer. The author remarks that the differences between the temperature of the morning and evening hours of observation were greatest, on an average, during clear weather; that is, when the radiation of heat from the ground is greatest.

The reading of another paper, by the same author, entitled "On the Ice, formed under peculiar circumstances, at the bottom of running Water," was commenced, but not concluded.

SIR BENJAMIN COLLINS BRODIE, Bart., Vice-President, in the Chair.

The reading of a paper entitled, "On the Ice, formed under peculiar circumstances, at the bottom of running Water." By the Rev. James Farquharson, of Alford, F.R.S., was resumed and concluded.

The ice, which is frequently observed to collect at the bottom of streams and rivers, differs in appearance from that which is formed at the surface; for, instead of assuming the shape of solid glass-like plates, it has more the appearance of aggregated masses of snow, and is composed of small crystals of ice adhering together irregularly, either by their sides or angles. Rivers are sometimes so choked up by accumulations of ground-ice of this description, that they are not only impeded in their course, but also raised considerably above their banks. While in this state, a slight change in the weather will frequently occasion the complete disengagement of this ice from the bottom; so that, in a very short space of time, the river returns into its natural channel;